

DATA STORAGE DEVICE FOR A DEVICE ACCESSORY

FIELD OF THE DISCLOSURE

[0001] The present disclosure is generally related to data storage devices and accessories for electronic devices that include data storage devices, such as cases for wireless devices.

BACKGROUND

[0002] Storage devices enable electronic devices to store and retrieve data. For example, a wireless device (e.g., a smart phone) may include a processor and a storage device that stores instructions and data that are accessible to the processor.

[0003] Examples of storage devices include volatile memory devices and non-volatile memory devices. A non-volatile memory device may retain data after a power-down event, facilitating convenient and portable data storage.

[0004] An electronic device may include a battery to provide a supply voltage to components of the electronic device when the electronic device is disconnected from a mains outlet or other power supply. For example, a wireless device may include a battery to provide a supply voltage to a storage device and to a processor. As data storage density and processing capabilities of the wireless device increase, battery consumption increases, reducing portability of the wireless device.

[0005] Further, batteries typically have a finite life cycle. For example, as a battery of a wireless device is subject to more charging cycles, the battery may discharge more quickly during operation, which may prompt a user to reconnect the wireless device to a mains outlet or other power supply more often. In addition, as a user stores and accesses more information at a data storage device of a wireless device, battery power consumption of the wireless device is increased.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1A is a diagram of a particular illustrative example of a system that includes a device, an accessory to the device, and a battery associated with the accessory.

[0007] FIG. 1B is a perspective diagram of an illustrative example of the accessory of FIG. 1A.

[0008] FIG. 2 is a diagram illustrating particular aspects of an example of the accessory of FIG. 1A.

[0009] FIG. 3 is a flow chart of a particular illustrative example of a method of operation of the accessory of FIG. 1A.

[0010] FIG. 4A is a flow chart of a first set of operations of another illustrative example of a method of operation of the accessory of FIG. 1A.

[0011] FIG. 4B is a flow chart of a second set of operations that may be performed in connection with the method of FIG. 4A.

DETAILED DESCRIPTION

[0012] An accessory of a device (e.g., a smart case for a smart phone) may include a data storage device and a battery (e.g., an auxiliary battery to the device that is integrated within the accessory). The data storage device may function as auxiliary storage for the device, and the battery may provide power to the data storage device and to the device.

[0013] The accessory may be configured to selectively enable or disable charging of the device by the battery based on a charge level of the device. For example, in some implementations, the accessory may activate charging of the device if the charge level is less than a first threshold (e.g., a “minimum” threshold) and may disable charging of the device by the battery if the charge level exceeds a second threshold (e.g., a “maximum” threshold). In an illustrative implementation, the first threshold and the second threshold may be designated by a user of the device, such as via an application associated with the accessory.

[0014] By disabling charging before the charge level reaches 100% battery capacity, battery usage of the device may be decreased. For example, charging the device to 100% may cause an operating system of the device to determine that the device is connected to a mains outlet and to operate according to a “full power” mode, increasing battery usage of the device. Thus, disabling charging before the charge level reaches 100% may reduce or avoid operation of the device according to a “full power” mode.

[0015] In addition, operating life of certain battery devices may be extended by reducing or avoiding charging to 100% of battery capacity. For example, certain devices may be associated with a particular number of charge cycles, such as a maximum number of charge cycles before battery capacity is substantially reduced. In this case, charging to 100% battery capacity and continuing to charge the battery after reaching 100% battery capacity may cause the device to alternate between charging and non-charging modes. Thus, avoiding charging to 100% of battery capacity may increase battery life of a battery by reducing a number of charge cycles of the battery.

[0016] Alternatively or in addition, the accessory may include multiple interfaces to the device to enable one or more components of the accessory to operate according to a low power mode. For example, a controller of the accessory may operate in or according to the low power mode if the controller is not scheduled to perform one or more tasks. As another example, a data storage device of the accessory may operate according to the low power mode. A first interface (e.g., a wired interface) from the controller to the device may be deactivated (e.g., to disable wired communications and charging between the accessory and the device). The accessory may include a second interface (e.g., a wireless interface) configured to communicate with the device. For example, the second interface may request an indication of the charge level of the device to determine whether the first interface is to be activated to enable charging of the device. As another example, the second interface may receive a wake up message from the device indicating that the first interface is to be activated, such as to enable the device to access a data storage device that may be integrated within the accessory to provide auxiliary data storage to the device.

[0017] The low power mode of one or more components of the accessory (e.g., the controller and the data storage device) may be controlled automatically by the accessory. For example, the accessory may initiate the low power mode and may exit the low power mode without user intervention, such as without requiring a user to activate a physical switch.

[0018] To further illustrate, particular aspects are described below with reference to the drawings. In the description, common or similar features may be designated by common reference numbers. As used herein, “exem-